

is in childhood and school days that the child is more susceptible to the infectious diseases—scarlet fever, measles, diphtheria, chicken-pox, etc., as likewise the contagious skin diseases. The school-room is a great factor in the spread of these contagions.

Education is a necessity. We realize this, and formulate laws for compulsory education, and whether this education is sought or forced, we must offer one free from the danger of contracting disease. Ofttimes a child has physical ailments which would disable him from accepting an education which we desire to force upon him. We should not offer or force a mental education until we have provided a physical capacity to accept such mental strain. The medical inspector has accomplished much, but only with the trained school nurse, and her individual care, personal inquiry, and knowledge of home life, is the highest degree of efficiency in education procured.

TUBERCULOSIS FIGHT TO BEGIN AT THE CRIB

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THE general care of children in the prevention of tuberculosis is, to my mind, the most important one in the fight against this disease. Medically, it is ideal to resort to preventive medicine, and especially to preventive medicine which begins at the birth of the child. Until recently the fact was not generally recognized that most infections date back to childhood. When V. Behring announced in his article, read before the Naturforscher Congress in Cassel, 1903, that the "infants' milk" was the main source of infection (in his own words: "*Die Saeuglingsmilch ist die Hauptquelle fuer die Schwindsuchtsentstehung*") he was most vehemently opposed by practically all authorities. Years before him, a few men had fought for the recognition of the same fact, but without creating sufficient reaction among the medical authorities; so V. Baumgarten always preached the heredity of tuberculosis. In 1894 Wolff wrote a clinical study of tuberculosis, and very plainly stated that all cases were infected in childhood; that the prominence of the disease a few decades later was due to influences which had brought the tubercle bacillus out of its latent state into one of marked activity. When one has read Wolff's book he receives his impression as if V. Behring had simply copied the former's views; this, of course, is not the case. It simply demonstrates

that it requires a man of supreme influence and authority, as V. Behring is, to cause hundreds and thousands of men to begin experiments and researches to ascertain the correctness of his statements; and this was the effect of V. Behring's address at Cassel. Since then there have been many publications, always more and more admitting the essence of V. Behring's work: namely, that tuberculosis begins at the crib. Behring says: "*Die Lungenschwindsucht ist das Ende vom Lied das dem Saugling an der Wiege gesungen worden ist.*"

So the fight against the so-called White Plague must also begin at the crib, if we are to master this destructive disease. The general outline of our campaign must be: 1st, to prevent the infection—that is, the entering of the tubercle bacillus, the germ which causes consumption, into the human body; 2d, to prevent the lowering of the vitality and general resistance of the human body, which must necessarily exist, if the tubercle bacillus is to develop consumption. In order to readily and intelligently understand how to apply preventive medicine in these two instances, we must first know the sources of the tubercle bacillus, and how it is spread; secondly, by which means and through which openings it enters the body; and, thirdly, how the general vitality is lowered.

By far the most important carrier of the tubercle bacillus is the sputum of open cases of pulmonary tuberculosis. An open case is one in which a disease area communicates with the outer world, as, for instance, a cavity which opens into a bronchus. This is a branch of a larger bronchus, which finally ends in the trachea, and the latter again opens, roughly speaking, into the throat and mouth, and so into the outside world. So, if in this cavity or diseased area there is any secretion containing tubercle bacilli, these organisms are theoretically already in contact with the outer world; but practically not until they are brought up with the sputum by a cough or sneeze, and spat upon the ground or floor, etc.

The careless disposal of such expectoration is the most general source of the tubercle bacillus. If we could successfully check this habit we would have the disease quite under control. In tuberculosis of the larynx, throat, and mouth, the spittle is also a means by which the germ is brought into contact with other parts of the body. The stools are infectious in intestinal, and the urine in kidney and bladder, tuberculosis. The number of infections occurring from these sources is at present considered small in comparison with the above named.

Another very important source of infection is tuberculous cattle, especially diseased dairy cows. Enormously high percentages of the latter have been found positive; in some herds the figures nearly

reach one hundred per cent., in most at least sixty per cent. Reports that fifty per cent. of the infected dairy cows have tubercle bacilli in the milk will impress every one with the severity of the danger. To be sure, Koch, the German professor who discovered the tubercle bacilli in 1882, claimed in 1901 that the bovine tubercle bacillus could not cause tuberculosis in human beings. But, according to the latest reports issued by the German government laboratories, experiments since then have proved that this is not so. Also, the organs of these animals have areas of the disease which in some cases might not be recognized by careless inspectors, butchers, and cooks, and so might easily be prepared for the table without necessarily destroying the life of the organism. These are then the most important sources of infection to the human being after birth. Before birth the child may have either what we term congenital or hereditary, due to infection either from the father or the mother. Recent reports seem to show that a high percentage of tuberculous mothers bear tuberculous children.

Now, the tubercle bacillus makes its entry into the human body by one or more of three ways: firstly, through the alimentary tract; secondly, through the respiratory tract; and thirdly, through the lymph and blood system. Examples of the last mentioned are the rubbing of dirt contaminated by the organism of consumption into sores on the face by children, or by getting tubercle bacilli in one's mouth from a cup used by an open case and having an injured area on the tonsils or elsewhere in his throat; from these entrances the tubercle bacillus would be carried by the lymph to the next lymph gland and from there to further lymph glands, in this manner giving us the picture of scrofula, which is nothing more than an infection of glands by the tubercle bacillus.

Infections by way of the respiratory tract are accomplished by the inhalation of the germs either in dust or in the coughed up spray of mucus coming from an open case. This mode until recently has been considered by far the most common entry of the tubercle bacillus, because the lesions of the bronchial glands and lungs are usually the greatest. Infections through the alimentary tract result from swallowing foods and liquids containing either the bovine tubercle bacillus, or the human, or both, as is often the case with milk. Because the market milk, which in many instances, as mentioned before, already contains bovine tubercle bacilli, has, immediately after it leaves the animal and before it is fed to the baby, so many opportunities to be contaminated with the human tubercle bacilli by infected and dirty milkers, milkmen, grocers, and mothers, and because it is practically

the only food taken by the child, and so acts as a wash-down for any germs which may be in the mouth and throat before nursing—because of all these facts Behring claims, and others are proving the correctness of his findings, that milk is the main carrier of tubercle bacilli, and the alimentary tract the main entrance for them into the human body.

Before I take up the real subject of this paper, the preventive care of children, I wish to remind you of a few conditions which tend to lower the general resistance of the body and so enable the germ to take a firmer hold. First, poor food and faulty feeding; second, poor sanitary surroundings, as small, dirty, badly ventilated, over-crowded rooms; third, lack of bodily cleanliness; fourth, lack of sufficient clothes or the contrary—too many dirty, filthy blankets, etc.; fifth, various diseases, as measles, whooping cough, influenza, typhoid, bronchitis, adenoids; sixth, overwork, as that of children in factories.

Now, how are we going to prevent children from getting tuberculosis? Some one might say: "Very easily: get the tubercle bacillus out of the world by educating the people not to expectorate except into paper napkins and cloths which can be destroyed after they are used, and force the farmers to have cows free from tuberculosis." The latter might some day be accomplished; but to my mind it will be impossible to educate the people to such a point as to exclude all possibility of spreading the germ of consumption about. Simply from this very fact, you will have to conclude with me that one must, of course, try to lessen the chances of infection, as, for instance, by having hospitals for needy patients who are beyond the chances of recovery, and who are a menace to their general surroundings, and try to educate the public generally to be more careful with the disposal of their sputum, whether they are healthy or not; but the main endeavor, under the circumstances, must be to try to keep the body in as healthy a state as possible in order to resist the tubercle bacillus in getting a hold in the human body, and, if it is securely located, to check its further mischief.

This is the key to the whole situation, and we begin immediately at the birth of the child with the most effective weapon: namely, the intelligent use of the mother's breast. Salge says: "*Jeder Monat, jede Woche, jeder Tag, an dem der junge Saugling Muttermilch bekommt, gibt ihm Staerkung der Widerstandskraft fuer den Kampf um ein junges Dasein, wie sie keine andere noch so schoen herausgekluegelte Naehr-methode ermoeglicht.*" There is a small percentage of mothers who cannot nurse their children, either because they have tuberculosis or have an insufficient secretion of milk. It is, however, a most

deplorable fact that the number of deficient breasts is much smaller than the percentage of mothers who claim, as they say, that they have not enough nurse.

So our ideal is to nurse the babe, and to nurse it intelligently. Do not overfeed it; this is about the only important manner in which the natural food can be of harm to the child.

If a mother really cannot nurse her child, she must, of course, resort to artificial feeding, and here quality, quantity, and cleanliness are the passwords. We must demand that the babe gets milk that comes up to the necessary requirements, as, for instance, to those of the local Milk Commission; namely milk from tuberculin tested cows, and having a bacteriological count, at the highest not above 30,000 per c.mm. Through the endeavors of this Milk Commission, our city (Cleveland, Ohio) has been provided with such milk. It is the Canfield certified milk, and is the only milk which ought to be used when the mother's breast is not available.

After the child has successfully passed the first year, the quality of the food is of much less import. Among the poorer classes, the deficient quantity plays a more important part. Through the endeavors of the Milk Fund and Visiting Nurse Associations, an Infants' Clinic has been established at the Central Friendly Inn for the poor in this and neighboring districts. Necessary instructions and milk are, of course, given to the sick children; but the main object of this clinic is to get the mothers to bring their babes before they are ill, and learn how to feed their children intelligently as they grow older. This is preventive medicine in the true sense of the word.

To change poor sanitary surroundings, such as small, dirty, badly ventilated, overcrowded rooms, to stop overwork in factories, to impress the importance of personal cleanliness, and, by doing these things, to lessen the spreading of infectious diseases, we must resort to two methods: first, the betterment of the financial standing of the families, and second, the education of the children at the schools—for many parents are too ignorant to give their children the right kind of advice. Another means of doing away with the above-mentioned conditions, which I nearly forgot to mention, would be to enact a law requiring the erection of sanitary homes—sanitary as to space, light, air, sewerage, etc.—and, what is just as important, to have this law enforced. In the meantime we must teach the children to sleep with open windows and keep out of doors at least a number of hours each day. They are to frequent the public bath houses, playgrounds, and parks, and in this manner keep out of their dungeons at home. During the summer almost every child, but especially those of the

poorer classes, ought to be sent to the country, as has been done during the last summer by the various charitable institutions of the city. Children of tuberculous families ought to be examined by a competent physician for the presence of this disease, whether they are healthy or not. This work has been done since November, 1905, at the Family and Children's Department of the Western Reserve Tuberculosis Dispensary, and till now three hundred and sixty-three have been examined, of which seven per cent. are positive and another seven per cent. suspicious.

Now, to lessen the chances of coming in contact with the germ of consumption, children are to be taught to bring nothing that may have in any way been contaminated with the tubercle bacillus to their mouths or to any sores; especial care is, of course, to be taken if a member of the family has tuberculosis. The latter should sleep alone, use separate dishes and towels, and dispose of his sputum carefully. As soon as any child coughs for any length of time, has night sweats, is easily fatigued, etc., he should be brought to a physician for examination. Those parents who are able should have a separate play-room for their children, and, what is better, put a clean sheet on the floor of the same each day if a creeper is in the house. This would give less opportunity to the child to bring contaminated material to its mouth. The bad habit children have of putting their fingers, pencils, gum and candies which others have already tried, into their mouth, and many things more in this category, should not be allowed.

These few remarks, I hope, will, on the one hand, impress you with the severity of the dangers confronting the baby if we are negligent, and at the same time, on the other hand, impress you with the great possibilities given to us to preserve the health of the infant in many instances. This means less tuberculosis.

LIVES of great men all remind us
We can make our lives sublime,
And, departing, leave behind us
Footprints on the sands of time;—

Footprints that perhaps another,
Sailing o'er life's solemn main,
A forlorn and shipwrecked brother,
Seeing, shall take heart again.

LONGFELLOW'S "A PSALM OF LIFE."